Chapter 2
Utilization of this Engineer Manual

2.1 General

This chapter discusses how this manual may be used to prepare, review, and implement an SAP. It also describes how the manual may be used by USACE personnel as a source for specifying sampling instructions when preparing the SOW or, in the case of a site-remediation project, the plans and specifications for the project. How to execute an SAP and verify compliance with the field and analytical procedures specified in the SAP are briefly described also.

2.2 Scope of Work Preparation

2.2.1 This engineer manual contains information that may be used during the technical planning of projects and generation of project SAPs. It is a USACE mission to characterize and remediate HTRW-contaminated sites in an efficient, cost-effective, and technically sound manner. To attain this goal, technical planning teams should utilize other USACE guidance for standard outlines on scoping HTRW investigations, chemical quality assurance, and HTRW technical project planning. Refer to EM 200-1-6, Chemical Quality Assurance for HTRW Projects; and EM 200-1-2, Technical Project Planning (TPP) Process, for information on scoping, the QA elements available for Chemical Data Quality Management (CDQM) execution, and technical project planning protocols, respectively. With the assistance of these guidance documents, the technical team must at a minimum generate a project SOW that clearly identifies project goals, associated data needs, and application of QA elements based upon the project goals designed to reach site closeout. The team may decide to further clarify the effort within the SOW by identifying specific requirements for implementation of defined data collection options or a specific data collection program, or appropriate performance and/or measurement quality objectives for QC samples and corrective actions necessary.

2.2.2 The appendices of this manual contain sampling and analytical SOPs that may be considered when identifying the data collection options and/or program. These include, but are not limited to, various matrices sampling and sample handling techniques, analytical methods, field and laboratory QA/QC protocols, documentation requirements, and appropriate references. DQO statements that describe the data collection design for sampling and analysis of each matrix must be defined.

2.2.3 USACE personnel may specify in the SOW or plans and specifications the individual instructions or SOPs that should be used in the SAP, or they may simply reference this manual as a source of SOPs. Contractors providing services for USACE may have their own sampling and analytical SOPs that would be suitable for a given project. In these cases, this manual provides a format for structuring the contractor's instructions for inclusion in the SAP. This will ensure continuity in the HTRW program. If project-specific objectives and strategies cannot be satisfied by any of the instructions in the relevant appendices, references for alternate sampling and analytical methods are included in Appendix A. Paragraph 4.4 of this manual discusses how to develop new sampling and analysis instructions.

2.3 SAP Preparation

The following three-step approach is suggested to prepare the SAP. The SOW or plans and specifications will specify the extent to which the architect/engineer or remedial action contractor will interact with USACE during the three-step approach.

2.3.1 Step 1: Consult with technical planners. Contractors working under agreement with USACE should initially consult with USACE technical planners to obtain project information. This step is not applicable to USACE in-house projects because USACE technical planners (technical managers and/or project scientists/engineers) actually prepare the SAP. USACE technical planners may interact directly with their customer to obtain information. However, contractors working under an agreement with USACE should consult with USACE technical planners to obtain important facility information, data from previous investigations, and information regarding site constraints.

2.3.2 Step 2: Review appropriate project documentation/literature. Before writing the SAP, perform a thorough review of all appropriate project documents. Foremost is the SOW or plans and specifications for the current work effort. These documents contain results from the technical project planning process as outlined in EM 200-1-2. As noted previously, the level of specificity outlined within these SOWs may vary from outlining general project goals with appropriate references to specifying sampling and analytical requirements to meet the project-defined data quality objectives for each matrix. Other applicable references required for background information should be identified within the SOW also. These may include, but are not limited to, applicable engineer regulations and guidance documents, regulatory program and status reports from previous studies and investigations, construction data, ownership/operational histories, site maps and photographs, information on regional and site geology, hydrogeology, hydrology, topography, ecology, climatology, demographics, and current and future land use.

2.3.3 Step 3: Review requirements for format and contents of SAPs. Chapter 3 discusses the general format and content requirements for the FSP and QAPP portions of the SAP. A good working knowledge of these requirements is necessary to understand the type of information required to draft an SAP and determine if additional sources of information are required. If it is determined that the sampling and/or analytical methods in the appendices of this manual or other existing references are not appropriate, Chapter 4 of this manual can be used to develop site-specific protocols.

2.4 SAP Review/Approval/Distribution

2.4.1 Review. The SAP should be reviewed to determine whether it will provide data that satisfy customer and technical planner data needs, whether it satisfies the data use and data quality objectives, and whether it is compatible with all site constraints. Reviewers should use the “review checklist” found in Appendix J as a guide for reviewing the SAP. This checklist is a very general guide and contains information that typically should be included in an SAP. USEPA/state guidance documents for preparing CERCLA/RCRA investigative plans may also be consulted.

2.4.2 Approval. After the SAP has been reviewed, the document can be accepted as is or returned to its authors for review comment resolution. Once the SAP has been approved, appropriate personnel sign the signature page, and the SAP becomes a contractual document. The USACE personnel that will sign the SAP will be determined on a project-specific basis by the technical planning team. It is recommended that the USACE technical manager sign the title page of the SAP and that the USACE chemist sign the title page of the QAPP. Any deviations from the approved document must receive

written approval from USACE. In addition, there may be significant changes in the project that necessitate that the SAP be appended or modified. Similar procedures of review and approval for those modified sections would be necessary prior to execution of the modifications.

2.4.3 Distribution. Once approved, the final SAP or its modifications must be distributed to all parties as defined within the SOW contract. These may include USACE technical manager, primary or referee (QA) laboratory(ies), any regulatory authorities, customer, and any subcontractors (i.e., drilling or sampling firms, data validation firms, etc.).

2.5 SAP Execution and Compliance

This manual may be used by USACE contractors and USACE oversight personnel as a guide for either executing the SAP or monitoring compliance with the SAP. Before data collection activities are implemented with either contractor or USACE resources, an approved SAP must be in place. All laboratories must have an approved SAP in order to be aware of project analytical requirements, must be able to meet and perform all aspects of the required chemical analyses, and must provide data reportables as specified within the QAPP portion of the SAP. Execution of the SAP must be performed in compliance with the approved SAP. Field personnel must be adequately trained for their duties and possess a full understanding of all aspects of the SAP. Sampling personnel shall ensure that proper field equipment is available and in good condition, and sample collection and handling procedures, including sample preservation, are performed in accordance with the prescribed sampling instructions or SOPs. A liaison between the field and laboratory (however named) shall be identified and shall ensure smooth transition of all samples from the field to the laboratory. Liaison duties may include implementation of proper sample packaging and shipping procedures and any communication or notification with the laboratory. Safety and health requirements and practices as defined in ER 385-1-92, Safety and Occupational Health Document Requirements for Hazardous, Toxic and Radioactive Waste (HTRW) and Ordnance and Explosive Waste (OEW) Activities, must be adhered to throughout all phases of environmental sampling operations. During the execution of the SAP, compliance is monitored by USACE by conducting field, desk, and laboratory audits. In addition, implementation of the project-defined QA elements (i.e., field control samples, referee laboratory analyses, data assessment procedures, etc.) allows additional insight into sampling and analysis activities. While data collection activities are being performed, the sampling team should communicate daily with appropriate USACE personnel regarding project status by submitting appropriate documentation as outlined in the SOW. Lastly, the final report review provides an opportunity for verification of DQO attainment, data assessment, and identification of any value-added procedures or corrective actions necessary. EM 200-1-6, Chemical Quality Assurance for HTRW Projects, provides guidance on field and laboratory techniques for assessing chemical data, identification of any limitations on data use, and recommended documentation procedures. The use of statistics during the data assessment may also be recommended by the regulatory authority.

2.5.1 Quality assurance (QA) elements. As defined in EM 200-1-6, there are several QA elements that may be applied to an HTRW project to ensure proper execution of CDQM. These include, but are not limited to, validation of chemistry laboratories, proper technical review/approval of project documents (i.e., SAP), field and laboratory audits, QA sample handling verification, referee lab (QA) sample analysis, use of single- and double-blind performance evaluation (PE) samples, data review and/or data validation, magnetic tape audits, and generation of Chemical Quality Assurance Reports and Chemical Data Quality Assessment Reports. The project SOW or, in the case of a site remediation project, the plans and specifications must define the appropriate QA elements to be applied to the project, the frequency of application, and any notification, contingency, or corrective action protocols necessary

in the event of deficiency or failure. This information must then be reiterated within the project documents to clearly define QA implementation procedures.

2.5.2 Audits. USACE personnel should conduct field and desk audits for all field sampling activities conducted as part of the HTRW program. Laboratory audits may be performed in conjunction with the laboratory validation process; district personnel are also encouraged to perform precontract or preaward system audits of the laboratory to ensure proper communication and awareness of project DQOs are in place. Combining these audits to increase overall effectiveness of the audit is recommended. The audits of field activities should be performed whether the project is executed in-house or by contractors for any phase of work from initial investigation to postclosure monitoring. This oversight is necessary to ensure that approved procedures, as specified in the SAP, are used to perform the work. Field audits include monitoring critical activities, such as well installation and well development, placement of other types of sample access devices (e.g., passive soil gas collection media), decontamination of equipment used to generate samples or other activities that could cause cross-contamination, sample collection from all media (i.e., air, ground water, surface water, soil, sediment, and waste), and postsample collection activities (packaging/shipping). Field audits should be scheduled as early in the activity as possible to identify procedures that could cause problems with the sampling and analytical results. Checklists included within EM 200-1-6 may be used to enhance consistency and completeness of the field audits conducted; as well as providing an aid for documenting the audit results. Another mechanism for monitoring field activities as they occur is to perform desk audits. This is usually done by reviewing daily contractor QC reports, chain of custodies, and field logs while the field activities are in progress. The SOW or plans and specifications should have a requirement stating that these reports be supplied on a periodic basis (e.g., daily or weekly).

2.5.3 Corrective action. The SAP should also address notification and corrective actions that should be followed by field and laboratory personnel if there are deviations from the SAP or problems with samples upon receipt at the laboratory. Typical problems/deviations include, but are not limited to, the following: improperly preserved samples, improper chain-of-custody documentation, broken sample containers, sample relocation, insufficient volume, etc. As a minimum requirement, the SAP should state that significant changes to or deviations from the approved SAP should not be made without the written approval of USACE. The QAPP should also describe corrective action procedures that are required if field and/or analytical procedures are found to deviate from the requirements in the SAP. Example corrective action measures include, but are not limited to, resampling with additional analysis of new samples, reanalysis of existing field or QC samples, or proper data qualification. Appendix I provides additional guidance on corrective action requirements of the laboratory.